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ABSTRACT

The goal of this third year of an ongoing 5-year study was to identify and evaluate the diverse technology and product needs of persons with functional limitations, from users' perspectives. This qualitative research study involved 14 focus groups representing 4 different categories of people; those included persons 50 years and older with sensory impairments, mobility limitations, or manual dexterity losses, or caregivers of older persons with disabilities. The study examined: group demographics; consumer needs that supersede product concerns; older consumers' orientation to technology; attitudes towards work and the workplace; product features, such as cost, safety, and ease of use; product selection criteria; consumer observations about mobility devices and communication tools; information channels for learning about consumer products; general recommendations for product improvement; creative solutions to consumer needs; and "wish list" items. The study concluded that orientation to technologies did not appear to be a function of age, that design features were the most formidable obstacles to product use, and that a sense of autonomy was important to older people with functional limitations. (JDD)

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INCREASING INDEPENDENCE THROUGH TECHNOLOGY

THE VIEWS OF OLDER CONSUMERS WITH DISABILITIES AND THEIR CAREGIVERS

CONSUMER NEEDS ASSESSMENT PROJECT YEAR 3

RESULTS OF THE THIRD YEAR OF A FIVE YEAR STUDY

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September, 1991

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Introduction

The longer I live the more I realize my independence through electronic gadgets.

... [S]o we're uncomfortable even trying to figure out what would be best for us ... we don't have the know-how.

I remember when I had to work the telephone for my grandmother, dial it. That dial telephone was too much for them [sic] and they couldn't talk to the operator in that thing on the wall. So I had to work it for them. And now the children have to teach me to use modern devices.

Consumers with disabilities over age 50 voiced these opinions during focus group sessions conducted in the fall of 1990 by the Electronic Industries Foundation Rehabilitation Engineering Center (EIF/REC). Their statements reflect the various ways in which older adults with functional limitations approach modern technologies. Some adopt and benefit from these consumer products, while others lack knowledge of and exposure to such devices and fear their operation. Another expressed viewpoint perceives technology as part of a continuum. Where once new products, such as dial telephones, were viewed initially with skepticism by those unaccustomed to such gadgetry, they are embraced eventually as a part of everyday life through recurrent use by members of all generations.

The individuals who are quoted in this paper participated in the third year of the EIF/REC Consumer Needs Assessment Project. The goal of this ongoing five year study funded by the National Institute on Disability and Rehabilitation Research (NIDRR) is to identify and evaluate the diverse technology and product needs of persons with functional limitations from users' perspectives. Using focus group research methods, data are being compiled regarding the impact of technology on the lives of persons with disabilities.

The EIF/REC is one of a handful of organizations that conduct qualitative market research using focus groups composed of persons with disabilities. Interest in investigating the needs and preferences of consumers with disabilities using this technique is increasing, as evidenced by a small but growing body of recent literature detailing such studies. Batavia and Hammer convened focus groups of persons with sensory and mobility impairments to identify and rank general design features of assistive devices so that consumer based criteria could be developed for assessing such products.[1] Additionally, Sandow and Trimble collected product ideas from consumers with disabilities using consumer idea generation groups and focus groups as part of a technology transfer project.[2]

Other efforts to understand better the product and service needs of persons with disabilities are taking place in states that have received federal grants under P.L. 100-407, The Technology-Related Assistance for Individuals with Disabilities Act of 1988. Their purpose is to develop comprehensive statewide assistive technology service systems. To accomplish this task, the states seek information from consumers. Although different in

format from focus group methodologies, consumer forums, surveys, and meetings have been conducted to encourage consumer participation in the design of efficient service systems.

A new initiative of the Consumers Union (CU) is notable in its potential impact on disabled and non-disabled consumers alike. This well-known, nonprofit membership organization provides information, education, and advice about consumer products, services, and financial management issues. In the March 1991 edition of its monthly magazine, Consumer Reports, the Consumers Union announced its Program for Consumers with Disabilities.[3] CU is committed to dispensing consumer product information geared specifically to persons with functional limitations. The assistive technology staff of the Washington, D.C. based National Rehabilitation Hospital is organizing focus groups of consumers and rehabilitation providers as a component of the program. Coincidentally, EIF/REC Year 3 focus group participants recommended an activity that would produce unbiased product information and evaluation, similar to the Consumers Union effort (see page 21).

The focus groups are typically composed of between eight and twelve participants, and sessions tend to last between two and three hours. Group discussion, led by a trained moderator, centers on such issues as participant attitudes towards product features that affect their abilities to use the devices effectively, their feelings about using high-tech devices, and their experiences with specific products. Participants are also asked to name "wish list" devices, equipment that they want and need but to which they currently do not have access. Additional topics covered include their channels of information for learning about consumer products, settings (e.g., the home, the workplace, the community) in which they use devices, and other perceived needs that influence their attitudes about technologies.[4] Items considered encompass both general consumer products, such as household appliances, and assistive devices developed specifically for persons with functional limitations, such as braille printers or hearing aids.

Focus group sessions are tape-recorded and transcribed. The analyzed findings are printed annually in monograph form.[5] These publications, identifying consumer product needs and preferences, are distributed to researchers, product developers, industry representatives, service providers, government agencies, and policymakers, and to consumers with disabilities and their families. They can use the information to set research and development priorities and to advocate for systemic changes that can facilitate access to and use of technologies by persons with functional limitations.

Group Demographics

During the third year of the Consumer Needs Assessment Project, the EIF/REC held 14 focus groups in three regions of the country: the Southwest, the Northwest, and the Southeast.[6] EIF/REC staff identified local organizers in each geographical area who worked in university-based gerontological and creative retirement programs, hospitals, an adult day health program, and a rehabilitation center. Their mission was to recruit focus group

participants for the study. The organizers often received assistance from colleagues working in retirement communities, senior centers, nursing homes, and voluntary organizations. As in years past, attendees were not randomly selected. Organizers found these individuals through their affiliations with community programs and support groups.

The EIF/REC sought focus group members representing four different categories of people. Three groups were to include persons 50 and older divided according to the following functional limitations: sensory impairments, mobility limitations, and manual dexterity losses. The decision to separate groups by functional limitation as opposed to precise diagnostic categories came from Year 2 project findings that recognized diagnostic classifications to be artificial boundaries.[7] A fourth set of focus group participants was to contain caregivers of older persons with disabilities. The caregivers could be spouses, children, siblings, other relatives, or friends of any age.

The EIF/REC decision to investigate the technology needs of older people with functional limitations was a natural outgrowth of findings identified in earlier years of the study. Focus group members raised the specter of the aging population, with its growing number of people experiencing chronic health conditions, as a reason why the marketplace would be forced to become increasingly responsive to the technology needs of consumers with disabilities.[8] Statistics seem to support this assertion. Due to the decline in birth and death rates, the average life span of the United States population is increasing. In 1989, 31 million people were 65 and older, representing 1 out of 8 Americans, 12.5% of the U.S. population. This figure represents an increase of 21% since 1980. The largest growth in this population is expected to take place between 2010-2030, when the baby boom generation reaches 65.[9] In addition, it should be noted that the fastest growing segment of the aging population is 85 and older, and the likelihood of acquiring chronic conditions and functional limitations increases with age.

This population shift has major ramifications for family life. Since relatives provide 80% of the informal care that allows older people to reside in their communities, these responsibilities can alter the lifestyles and employment opportunities of these caregiving families. Caregivers often become the gatekeepers for and users of many products and services needed by their aging relatives. Given these circumstances, the EIF/REC conducted focus groups comprised of caregivers to discuss from their vantage point both their technology needs as care providers and the needs of those they assist.

Demographic changes are causing a transformation in the workplace. Although the workforce is aging, the numbers of older workers continue to decrease. Labor shortages will develop unless efforts are made to employ, retain, and train older workers, including those with functional limitations. To address this issue, questions regarding attitudes towards work, retirement, and technologies useful in the workplace were incorporated into the Year 3 Moderator's Guide.

As people live longer and more of them age with a disability or develop limitations later in life, new opportunities, roles, products, and services must be developed so they can remain productive in the home, in the workplace, in the family, and in social settings. Understanding older people's orientation to technology and how they perceive their needs can promote the development of products that are accessible and acceptable to this growing segment of the population.

While the majority of focus group members met the EIF/REC criteria for participation, variations did occur. For instance, scattered among the groups of persons with functional limitations were a few participants who were under the age of 50. Sometimes, group sessions were less than two hours, as in the case of a supplemental focus group meeting held at an adult day health care program in the Northwest where schedule conflicts did not allow for a lengthier session. In that region, two groups of persons who have a combination of mobility and/or manual dexterity problems were held to compensate for low attendance in the first session. Additionally, an individual written interview was conducted with a focus group member who was deaf in the adult day health care setting. No interpreter had been scheduled for the session because no deaf participants were expected, but he requested an opportunity to air his views thoroughly by written word.

As reported, the use of medical diagnostic categories was unsatisfactory in Year 2 of this project, but Year 3 efforts to create homogeneous groups based on functional limitation also failed to create simple, standardized categories or to capture the diversity of the people involved. For instance, although only one focus group meeting consisted solely of persons with hearing impairments, several people with visual, mobility, or manual dexterity limitations used hearing aids or other amplification devices and discussed needs caused by auditory losses. Many focus group members could have easily been candidates for several functional limitation groupings. Additionally, several focus group members had conditions, such as osteoporosis, often associated with the aging process. Older participants who have multiple impairments were not uncommon.

Differences also existed within the caregiver groups. The EIF/REC wanted to study the views of caregivers who were either family members or friends who provide care to older persons, but one caregiver group contained several professional caregivers (i.e., people who earn their living as personal care attendants). Occasionally, caregivers of young family members were present at the sessions. One sponsor decided to organize two separate caregiver meetings, one comprised of family members caring for those with physical limitations, the other consisting of caregivers of persons with cognitive impairments caused by such conditions as Alzheimer's Disease and other disorders. The organizers reasoned that distinct issues might be raised by establishing separate groups of caregivers. As with the focus groups consisting of persons with functional limitations, the caregiver groups expressed their diverse needs articulately, providing substantive information.

The EIF/REC has found that many unintended benefits accrue from employing focus group research techniques. The sessions, while eliciting information from participants, also

provide a supportive environment where attendees exchange ideas and learn from each other. This experience was consistent with findings from earlier years of the study. During the sessions, focus group members often heard about products or services that they did not know existed. Some focus group members brought in devices they use, such as a clipboard with an extender allowing a person to open and close it with one hand, a key holder, and a molded stick employed as a grabber. A caregiver even shared drawings of a portable tub bench designed by her husband.

In the sessions, participants learned about support groups, magazines, and information sources that could assist them in their search for products. Participants enjoyed having an opportunity to discuss their concerns and ideas for the purpose of improving products and services available to persons with disabilities.

Consumer Needs that Supersede Product Concerns

Although technology is the primary emphasis of the EIF/REC Consumer Needs Assessment Project, this issue does not adequately reflect the full spectrum of needs identified by Year 3 focus group participants. This finding is consistent with data collected in previous years of the study, but it does not imply that technology has no role in improving social and economic matters. Interdependent relationships exist among the diverse personal needs identified in this study. For instance, social and economic issues may affect consumers' ability to access and use products. Nonetheless, it is instructive to examine these needs separately. Year 3 Focus Group members sought:

- Ways to educate the general public to raise awareness, reduce ignorance and to change negative social attitudes towards age and disability. For example, one focus group member stated, "I'm a person, I'm not a condition." Well-meaning but patronizing behaviors were described. For instance, one participant commented, "I wish people would learn to ask, may I help you, instead of assuming, you poor thing you know, let me help you." Another focus group member explained that often people shout, mumble, or fail to speak slowly and enunciate clearly when communicating with a hearing impaired person. Some consumers with disabilities felt that a stigma is attached to assistive devices. A focus group member described how she sometimes leaves her mobility cane in her bag since others seem hesitant to approach her when she uses it. Recommendations to help change such attitudes included the use of the media to develop Public Service Announcements (PSAs) on ways to communicate with persons with disabilities and to create television series characters who have disabilities. The Americans with Disabilities Act, sweeping civil rights legislation signed into law in July 1990, was also viewed as a possible catalyst for correcting negative attitudes.

- Increased opportunities for socialization and human contact through support groups, adult day health programs, and senior center programs. One user of adult day health care clearly stated that it is a wonderful service for people who live alone and want to be with other people their own age.

- Human assistance. Some focus group members with functional limitations mentioned difficulties in shopping alone, or needing help in activities of daily living (e.g., dressing or undressing). They also discussed difficult issues such as how to decide whether it is time to no longer live alone or to stop driving. Family caregivers asked for in-home care, respite, meals on wheels, and hospice services. These forms of aid can provide them with a break from caregiving tasks, occasions for privacy, or for reaching out to other people. Support groups were also touted as a means for families to gain valuable information on community resources and hands-on care (e.g., lifting a person without straining oneself) to help them assist their relatives effectively.

- Increased sensitivity and awareness of the needs of people with disabilities and their families by the medical community. Physicians were criticized for their seeming lack of concern for persons whom they are unable to cure. Poor coordination among physicians treating individuals for different health conditions was cited, a particular concern for older people who have multiple chronic impairments. Inadequate networking efforts among support groups, voluntary organizations, and doctors were also discussed.

- Recognition of and relief from financial woes they experience. Several focus group members mentioned the difficulties of managing the staggering costs of medications (many older people use a variety of medicines), medical bills, and the general costs of living (food, shelter, clothing) on fixed incomes.

- Medicare reforms. Paperwork headaches, including confusing and incorrect billing procedures requiring consumer vigilance were decried. Some focus group members found it very difficult to maneuver their way through this bureaucratic system. Additionally, the issue of Medicare reimbursement for assistive devices is a mystery to many participants.

- Increased accessibility of public accommodations. In the focus groups consisting of persons with mobility impairments, steps, thick carpets, sand or gravel surfaces, heavy or small doors or those with high tresholds, no railings, and limited handicapped parking facilities were just a sampling of the obstacles consumers confronted when attempting to use public and commercial facilities. Group members suggested such modifications as automatic doors with electronic eyes, lower Automatic Teller Machines (ATMs) for wheelchair access, wheelchair locks on public transit that can be adjusted to different types of scooters and wheelchairs, or benches in stores where individuals could

rest while shopping. The height of grocery shelves came under fire from persons who have difficulty reaching including those with manual dexterity problems. Some focus group members recommended chairs with casters in contrast to heavy seats in such settings as restaurants. A consumer with a hearing impairment urged expanded use of amplification through a conference FM system in public meeting rooms. Visually impaired participants discussed talking elevators or other methods to indicate which floor has been reached. Negotiating store aisles where boxes often blend into the floor, as well as finding and correctly identifying which public restroom to enter were also considered. Members of focus groups recognized that accessibility has different meanings in different settings. Caregivers echoed the frustrations surrounding these issues. Regarding leisure activities with her relative, one caregiver explained, "It's almost such a job, it's not worth the effort."

Older Consumers' Orientation to Technology

Devices are fine, but ... we need to fit these devices into our lifestyles. You can't just say ... "Here's a device."

... [Y]ou've got great diversity amongst the hearing impaired population. We've got all sorts of different levels of adjustment due to hearing loss. And some people are still in denial. Some people are very accepting of it and are willing to use devices that other people wouldn't touch with a ten foot pole simply because they deny they even have a problem or they're not comfortable with it.

There are any number of people out there whose vision is declining and they don't know that there are ways to help them because they say, "Oh, I'm getting old and that just happens."

These comments by focus group members show that the setting and the method used to introduce them to different technologies and their personal attitudes towards their own functional limitations are among the factors that can influence their acceptance of and willingness to use such products. They expressed varied opinions about general consumer products, assistive technology, and the role that such equipment plays in their lives. Divergent viewpoints were not uncommon in focus group discussions, but they were especially evident in consideration of computers. Several Year 3 participants were computer enthusiasts and spoke fervently of the advantages of using this technology. For example, one focus group member identified himself as an "electronics freak." At the other end of the spectrum, some focus group members, using age as an excuse, said that they would be unable to work with computers. In their opinion, their lives were simpler without these machines. One participant explained it this way, "I know it's the computer age, but at my age I'm not about to learn it now because I don't think it would stick." This sentiment was echoed by several participants, although often disputed by fellow focus group members who had computer skills.

One member of a mobility impairment focus group, interested in improving his writing skills, saw the computer as a useful tool. He was apprehensive about mastering computer technology, but his resistance to the product was worn down because he was surrounded by colleagues who benefit from computer use. Still other participants had exposure to such equipment through their children and grandchildren. Some were intrigued with it; others were not.

One participant in a focus group of visually impaired people considered computer technology in a more universal context. Speaking of people over age 50, he said, "I think most of us are concerned with everyday activities ... survival, getting ... properly fed ... and ... in a secure environment." In his view, learning computer skills would not assist him in attaining these goals. He did point out, however, that much of the speech synthesis technology developed for computers could be applied effectively to the basic survival needs that he had identified.

When discussing assistive technologies, caregivers commented on their family members' unwillingness to use certain devices. A tub bench might be rejected because the older person prefers bathing instead of showering. The alternative of a lift to enter or exit the bathtub may also be unacceptable. Caregivers reasoned that employing such equipment can be an unpleasant reminder of what their relatives are no longer able to do by themselves.

When acquainting individuals with technologies, timing is often an important consideration. For instance, caregivers commented that devices are not necessarily perceived as a great help, or potential tool, especially when a family is adjusting to providing assistance to an older relative. One caregiver stated, "Frankly, you don't think about extra equipment. You think about how am I going to cope?"

Attitudes towards Work and the Workplace

Work often plays an important role in the lives of older people with functional limitations. For instance, although many of the Year 3 focus group participants were retirees, they recognized the need to be productive, to accomplish tasks, and to help others. One participant explained, "I cannot keep from doing work ... work is something that keeps me going." Another commented, "It's a kind of medicine you can't get out of a bottle." Wasting time was viewed as a tragedy requiring a remedy. Focus group participants included many people who were actively working as housewives and volunteers in hospitals, rehabilitation centers, radio reading services, and hotlines. Others held compensated positions in social services or sales. One person described work as a point of pride, a reason for living.

Although interested in paid employment for financial reasons, several focus group members were uncertain about what kind of work they were capable of doing. The unpredictable nature of their chronic impairments even made it difficult for some of them to make a commitment to attend a focus group session. One group member commented, "The

thing I've found disgusting about this situation is the fact that you can't plan. You just have to do what you can do, minute by minute, hour by hour, and day by day...."

Some focus groups discussed disincentives to older people who are interested in returning to the workforce. One participant calculated that if he returned to work, he would lose money, since he would have to pay taxes on his earned income. He preferred to pursue his hobbies of woodworking and jewelry making instead. Other focus group members complained that private disability pension requirements discouraged attempts to reenter the workplace. Age bias was another issue considered. For example, one caregiver who was having problems finding a position felt that age discrimination was limiting her job options.

Several focus group members spoke positively about having retired voluntarily prior to the onset of their functional limitations. These individuals explained that they had decided it was time for them to do something different. Some of them also sought to open new opportunities to their younger work colleagues.

Although focus group members were asked about technologies that might have assisted them in remaining employed, participants were generally unable to suggest specific products. They also failed to consider strategies such as flexible time schedules or job sharing. For the most part, they did not identify technologies that they use in their volunteer or paid employment.

Product Features Cited by Focus Groups

Findings from the first three years of the EIF/REC Consumer Needs Assessment Project have shown that focus group members are eager to identify product design features that influence their willingness or ability to use various technologies. In the first year of the study, product needs were broadly defined within the following five classifications: safety/health, privacy, independence, convenience, and employability.[10] Year 2 participants commented on many of the same characteristics with certain additions. The ten features discussed by those participants were: cost, durability, maneuverability, ease of assembly/disassembly, repair issues, the height, location, size, texture, color and brightness of controls, safety features, simple instructions, aesthetics, and the ability to keep devices anchored while in use.[11] Not unexpectedly, older consumers with functional limitations and their caregivers reiterated many of the same concerns. Year 3 focus groups discussed the following characteristics in detail:

- Cost;
- Safety;
- Simple devices with easy to follow instructions;

- Control features; and
- Ease of use.

A review of these design features is presented below.

Cost

As in past years of this study, focus group members in Year 3 decried the expense of assistive technology and general consumer products. Cost continues to be a universal obstacle to the procurement of devices by persons with disabilities and their families, particularly for those living on a limited income. Knowledge of a product does not signify that a consumer can obtain it. One participant noted, "It's like showing a kid a red wagon and then saying, but we can't afford it." Another participant explained, "We are prisoners of the limits of our income and expenses." Lower prices were sought so that more people could pay for products.

Several older persons with functional limitations participating in the focus groups saw themselves as part of a "captive market" that manufacturers exploit. One focus group member commented, "Statistically, the largest population of the blind and visually impaired is over age 55. Many of them have been either unemployed or forced into retirement because of their loss of vision. So, we're talking about an impoverished group, by and large ... high cost electronics is going to be a problem."

Consumer frustrations are exacerbated since financing strategies available to most consumers are not always accessible to persons with disabilities. For instance, a participant stated that financial institutions do not generally provide credit for specialty equipment because they fear default on such loans. Repossession is not seen as a viable vehicle for recouping bank losses.

Some caregivers believed that the high price tags of assistive technology exist for the following reasons: such purchases are a one-time or rare occurrence, third party payors are often involved in the reimbursement process, and medical labels increase cost. One participant recommended establishing a network where fellow caregivers provide low-cost solutions to those who cannot afford expensive items. Yet, caregivers also recognized that potential cost-savings ensue from product use. For instance, while the price of gel type wheelchair cushions was criticized, an attendee pointed out that such products help prevent decubitus ulcers, which are painful, possibly lethal, and costly.

Several ideas were advanced in focus group discussions in response to the financial hurdles obstructing access to technologies. Increasing the market share of persons able to buy devices was considered. A consumer recommended the development of endowment programs to subsidize the cost of expensive equipment. Leasing programs or loan closets of

second-hand devices were also envisioned, especially since some products cannot be used over time if the user's physical condition worsens (e.g., a product that magnifies written text). Other suggestions included making computers with speech synthesis available in public libraries so that consumers who cannot afford such equipment can use them in public settings.

Safety

Safety is a major concern of the older consumers who attended the Year 3 focus groups. Seeking to remain self-reliant in their own homes, consumers from all of the functional limitation groupings discussed their fear of falling, injuring themselves, and being unable to signal for help. Many focus group members commonly used security devices such as grab bars, tub benches, cordless phones, or emergency alert systems to ensure against the danger of being injured and being unable to call for assistance. Other security measures were also considered in the discussions. An extreme example taken by some participants entailed abandoning their use of knives, vegetable scrapers, electric can openers, or other kitchenware. Others spoke of avoiding certain devices, such as the electric skillet, for fear of burning themselves or receiving electrical shocks from incorrect usage. Some participants discussed the advantages of cordless appliances where users do not need to worry about dragging electric wires.

Visually impaired focus group members considered safety issues in detail. They discussed the usefulness and expense of intercom systems to identify strangers coming to the door. Health issues can be considered under the topic of safety, and a costly but necessary safety item identified was the talking thermometer. For the kitchen, stoves with dials located in the front were recommended to avoid burns and fires.

Visually impaired focus groups also examined security outside the home. Obstacle detectors (a device that vibrates when an object appears in front of it) were perceived as valuable equipment. Traffic lights with beeper sounds generated more varied responses. Some participants felt these auditory cues were helpful; others feared they would become too dependent on them. These individuals felt it was more important to listen to the traffic to obtain essential auditory information.

Many caregivers rely on safety products when providing care to their relatives. Some use railings to avoid falls out of bed. Those assisting family members who have cognitive impairments spoke about using child gates to restrain wandering and sound monitors to note their relatives' movements. Other safety concerns caregivers mentioned included stove burners being left on, and use of scalding water in the shower or tub.

Simple Devices with Easy to Follow Instructions

Although some participants enthusiastically used new technologies, several Year 3 participants commented on their frustrations with multiple features available in many

electronic devices. Often, these consumers felt overwhelmed by these options. One example mentioned by a number of participants was a videocassette recorder (VCR) clock. Some consumers did not want or need these product add-ons.

Focus group participants expressed their desire for well-written, step-by-step directions, written in simple, plain English that will assist them in operating devices correctly. Many older people requested large print instructions. For those unable to receive such information visually, participants asked to have directions made available in alternate forms, such as through auditory, tactile, or other means. Some caregivers recommended that pictures and diagrams be employed in addition to text. They also suggested that manufacturers provide toll-free telephone numbers for assistance, especially in the case of electronic equipment.

Focus group members pointed out that manufacturers need to consider whether the location of instructions on a device is handy. Directions for recharging the battery on a wheelchair were cited as an example. A caregiver told of having to get down on her hands and knees to read through the instructions located on the battery. She recommended large character directions on all equipment so even those unfamiliar with the product could be pressed into service if their assistance was needed.

Control Features

Many older consumers who have disabilities have difficulty activating devices independently and knowing whether units have been turned on or off. Appropriate feedback cues are needed. This problem affected individuals in all functional limitation groupings, and a variety of solutions were proposed.

People with visual impairments explained that pressure sensitive or heat sensitive switches were inaccessible to them. Even if these users touch such a device to become oriented to its controls, they can accidentally press buttons causing the machine to function inappropriately. Consumers with visual impairments need ridges or dial-like mechanisms on controls to guide them. Other tactile or auditory displays may be useful for them. For example, a redundant auditory signal might be used to augment a lighted switch on a vacuum cleaner to show that its bag is full.

Focus group members with visual impairments also discussed the advantages of large buttons with high visual contrast (e.g., use of white on black and an avoidance of pastels) on such products as televisions. They also recommended standardizing the location of switches on products. Telephones were perceived as a positive example of devices that have standardized switches. Proper background lighting in tape recorders and other products would assist persons who have visual impairments to use the equipment correctly.

Members of the manual dexterity focus groups spoke about the difficulties of handling tiny, recessed controls or small wheel switches often found on lamps. Single faucet levers

on sinks were recommended as were large knobs or switches that could be adjusted by touch, sound, or with the back of the hand. Slide switches, such as those found on digital alarm clocks were cited as being difficult to maneuver. Some people liked and were able to use pressure sensitive controls, but others disagreed.

Some participants in the mobility focus groups discussed the convenience of remote controls and the ease of cleaning flat touch panels. Difficulties with toggle switches, often found on household appliances like toasters or vacuum cleaners, were mentioned. These consumers pointed out that holding and pressing multiple buttons simultaneously was a hardship.

Caregiver groups critiqued controls that were small and contained faint lettering. They saw the need for contrasts between pushbuttons and backgrounds, and sought devices that their relatives could use on their own, such as lamps operated by touch. One caregiver suggested possible improvements on sound cues. She explained that as people grow older, they sometimes experience hearing deficits. The auditory signals on oven timers, clock alarms, reminder beepers, or door bells are often difficult to distinguish.

Ease of Use

Many factors affect the ability of older people and their caregivers to operate a device. Products that are awkwardly shaped, bulky, difficult to maneuver, or that require strength, often incur user frustration and resentment. Older focus group consumers who have functional limitations cited problems with lifting, assembling, disassembling, using, cleaning, and stowing devices away. They felt it was sometimes not worth the trouble to use certain devices. These products included kitchen appliances, vacuums, reachers and even cutting boards. Caregivers complained about the bulkiness of the Hoyer lift (a hydraulic lift) and wheelchairs came under fire as well. One caregiver commented from bitter experience that wheelchairs are not fashioned with the ergonomics of the care provider in mind.

Product Selection Criteria

Focus group participants were asked to describe what questions they ask concerning new products when they assess a product's potential value for them. This approach was another means of identifying product features that influence the decisions of older consumers or their caregivers concerning acquisition and use of new devices. Several focus group members felt their inexperience with technologies made them unable to formulate such queries. Many participants, however, were able to share elements of their selection criteria. A critical issue examined in a caregiver focus group concerned who introduces a device, in what setting, and why. For instance, a newly disabled person with mobility and/or manual dexterity problems might receive a wash mitt in occupational therapy during a stay at a rehabilitation center. If someone else has to adjust that mitt on the individual, the small bit of independence gained may not meet the consumer's needs, particularly if the caregiver

must wash the rest of the person's body. In this case, whose interests are being served by the product's use?

Many focus group members were concerned about the length of time they could depend on a specific product because their physical conditions continually changed. For instance, a participant spoke of purchasing a VisualTek reader that he was slowly becoming incapable of using. As his magnification requirements increased, the technology was less able to assist him. Fellow group members debated the pros and cons of spending money on such a device that may provide limited service to an individual, instead of hiring someone to do readings. Conversely, a caregivers group recognized that sometimes when a family member's health status improves, a technology cannot be adapted to the change. Two examples discussed were an elevator built into the house and the locking mechanism for a wheelchair in a van. Since the first user became more independent and changed his wheelchair, he has been unable to turn around and exit from the lift alone. The other consumer required a new locking mechanism as he was able to drive with hand controls.

Several groups took into consideration whether or not they had adequate space to house equipment. They also questioned where they would use the device.

A participant in a manual dexterity group described the process she underwent when deciding upon a product. These are a sampling of the questions she articulated:

- Are there knobs on the device? Can I use them? Are they where I can reach them?
- Can a maintenance agreement be purchased so I don't have to worry when it breaks down?
- Will I use it once I get it? If it's a struggle, I probably won't be using it six months from now.
- Does it fit in one hand? Can it be used effectively with one hand? Can I use it with my weak hand, somehow?
- Is it lightweight?

A participant who was hearing impaired summed up his product selection criteria in one sentence, "What works best for me?" He put this philosophy into practice by visiting the Self Help for Hard Of Hearing (SHHH) technology center to test devices. Focus group members often sought opportunities to try out devices prior to purchase.

Consumer Observations About Specific Products

Focus group members commented on specific products that they depend on and provided additional insights into design features that benefit them. They discussed mobility devices (canes and walkers, wheelchairs and electric scooters, and automobiles) and communication tools (telephones and telecommunications devices for the deaf [TDDs], televisions, and computers) in detail. Participants reviewed several of these devices when they addressed wish list items (see pages 23-31). Focus group observations follow.

Mobility Devices

A basic need, recognized and talked about in all focus groups, is the ability to move around in safety. Many focus group members use canes, walkers, wheelchairs, and electric scooters as part of their everyday lives. Participants also discussed automobiles. These products generated much conversation.

Canes and Walkers

Canes and walkers engendered mixed reactions from focus group participants. Repeated falls were often the reason why consumers began using these items. Individual preferences varied. One cane user, a member of a manual dexterity focus group, felt freer with it than with other mobility devices. Another participant in a mobility focus group favored a canadian crutch (a crutch that fits on the user's arm rather than under the arm) over a cane. She felt it gave her more support, and was less of a strain to use than other products. Some consumers complained that canes were always in the way, and easy to leave behind. Additionally, they criticized cane holders as being too small to grip the product for which they were designed.

Participants also outlined problems with walkers. Some focus group members complained that they tended to bump into objects with them. Instruction in using a walker may be necessary. For example, a focus group member who utilized a walker with wheels on the front required training in its correct use. One must push down on the wheels in order to stop the walker from moving, not an easy skill to learn. Caregivers commented that walkers do not seem to move smoothly. They were also concerned that walkers with rollers tend to go out from under the user. The maneuverability of walkers was also considered. Focus group members commented on non-folding varieties. They are awkward to place in automobiles.

Wheelchairs and Electric Scooters

The cost of wheelchairs and electric scooters came under fire in several groups. While lightweight wheelchairs were praised, and increased product competition was seen as a way that prices could be lowered, the cost of these mobility devices received lots of attention.

Opinions on electric wheelchairs and scooters varied. Some consumers resisted using electric scooters, feeling they would lose some measure of independence by employing such equipment. Several participants explained they are difficult to manipulate for those with limited upper body strength. Others liked electric scooters, explaining that they were their main means of transport.

Consumers found both advantages and disadvantages in operating electric scooters. A consumer spoke about the Rascal, pointing out its good brakes, comfortable seat, and its maneuverability. However, transporting it in a vehicle is often a problem. This issue was raised about scooters generally -- the hardship of taking them apart, stowing them in a car or van, and retrieving them. Sometimes, other physical barriers exist to employing the device. For a Southwestern participant, the lack of curb cuts prevented her from using a scooter.

Users identified the benefits and flaws of their mobility devices. A Sierra electric cart user had difficulties with its electronic components breaking down. He also complained of poor seat design. While he liked the Sierra swivel seat, he received back pain from its use. He was in the process of purchasing a Fortress commuter electric wheelchair. He hoped for Medicare approval of the equipment and had received a doctor's prescription for it. He cited among its advantages that the Fortress is dual-powered, so if something goes wrong, a back-up system exists that allows the consumer to flip a switch and wheel it. He also, however, recognized its drawbacks. The Fortress joystick is very sensitive to the touch, an obstacle for those lacking fine motor control. One must learn how to steer it. It also did not have a swivel seat which he found useful.

Focus group members commented that wheelchair and scooter tires must adjust to different situations, which include varied weather conditions, rugged terrain, as well as problems with tie-downs on public transportation (e.g., buses). In the rainy Northwest, consumers recommended that wheelchairs be built to withstand higher levels of precipitation. Wheelchair users need accessories to help them transport such items as groceries or to adapt their wheelchairs for exercise use. Consumers also recommended adjustable wheelchair cushions so that those who steer wheelchairs with their hand and foot do not have their legs dangling because of the cushion's height. Conversely, a participant complained that his legs were too long for conventional scooters.

As co-partners in the use of wheelchairs, caregivers felt they needed many modifications. One participant recommended having a supplemental power source on a chair to assist him when pushing his wife uphill, across a grassy plot, or when negotiating a gravel path. Some focus group members recommended that electric wheelchairs have an optional set of steering and operating mechanisms in the back so that they can be operated by the caregiver. Other caregivers sought narrower and lighter wheelchairs which would be simpler for them to handle and transport.

Caregivers recommended wheelchair accessories such as easily maneuverable hand rests which would aid them when wheeling a family member to a table. One professional

caregiver identified problems with the mounting systems of communication boards on wheelchairs. They are difficult to get on and off, requiring many users to seek assistance. A latch system for such devices would be helpful.

A professional caregiver addressed other concerns by outlining her wish list of needed changes for powered wheelchairs. She felt that they are built to create back injuries in caregivers. By locating the battery and other accessories in the rear of the wheelchair, it is difficult for care providers to pull wheelchair users up if they are slipping. Electric wheelchairs need footholds or space for the caregiver's feet behind the chair. Reaching around or over the wheelchair while standing on the floor causes back strain.

This professional care provider shared wide-ranging recommendations to improve electric wheelchairs. She advised that recharger plugs and clutches be positioned in an obvious and accessible place where repairs can be made without the consumer transferring from the chair. Levers that pivot out footrests and armrest releases should be clearly marked with colored plastic or prominent arrows. She explained that small latches used to fasten armrests are easily bent and become difficult to put in place. She also believed that individual units that comprise a part (e.g., a footrest) should be available so that segments can be replaced without requiring purchase of the entire part. This individual felt that more replacement parts should be on the market to limit the wait for repairs. She also suggested placing electronics on a sliding bracket, instead of having a screw in component, improving the padding on joysticks since they are often bumped against tables, and developing quieter motors.

Automobiles

Many focus group members associated independence with driving. Several people with visual impairments felt they would be able to continue to drive, more safely, if signs were enlarged, magnifiers were made available on cars, and other markers were improved. Some focus groups discussed the importance of clear contrasts on the dashboard.

The manual dexterity focus groups praised cruise control and automatic transmission. A discussant in a mobility focus group mentioned that hand controls were not the only issue to consider when driving. Rather, he questioned how he would transfer into and out of a car. Several participants recommended remedies to this situation. One member of a manual dexterity focus group spoke about straps in her car which assisted her in exiting the vehicle. Another participant transferred out of a car using a plastic bag to slide on.

Focus group members discussed the issue of seeking assistance when on the road. Participants mentioned car phones and telephone booths that drivers could reach from their vehicles. Individual attitudes towards functional limitations were also covered. A participant discussed her reluctance to apply for a handicapped parking permit. She was uncomfortable being labelled in that fashion.

Caregivers had several recommendations for improving vehicles. They recommended portable steps that hook onto a car, or wider running boards that could help some individuals to enter and exit a vehicle. Some caregivers suggested automobiles with seats that swivel out.

Communication Tools

Focus group participants use various communication tools to facilitate interactions with the outside world. Telephones, TDDs, televisions, computers, and augmentative communication devices provide the means for accessing or exchanging information. The diversity of consumer needs were amply displayed when participants considered these devices.

Telephones and TDDs

Several focus groups discussed telephone amplification. Participants complained of having problems hearing the telephone and suggested increased amplification. One consumer found that an AT&T soft plastic mouthpiece was a helpful accessory since it cradles the shoulder. This sturdy device assisted the user in keeping the receiver close to his ear and mouth.

Some consumers who use wheelchairs carry cordless telephones. One participant discussed a model he had purchased. It was smaller than a cigarette pack, so it was easy to carry in a shirt pocket. Although he commented that it would be nicer if its numbers were bigger, an issue raised in other consumer groups, he recognized that enlarging the device could make it unwieldy to use. A participant with manual dexterity problems commented on a similar telephone. This model had an earpiece, and the device also fit in a shirt pocket. This allowed the user's hands to be free, and facilitated additional mobility. A member of a manual dexterity group explained the advantages of the Cobra cordless phone: one is not limited as to where the telephone can be answered, it is easy to operate with a sliding button on the side, and it has memory. Another participant found the AT&T 4500 too big and too heavy to use. In addition to cordless models, focus group members praised speaker phones, since picking up the device is troublesome for many consumers. Pushbuttons were not always favored. Some consumers prefer rotary dials because their hands fumble otherwise.

Focus group participants discussed Telecommunication Devices for the Deaf (TDDs). One man explained that he could not live without it. Another participant revealed that her TDD was often incorrectly dialed by non-TDD users. She recommended that a separate listing of TDD telephone numbers be included in the telephone directory, to alert those unfamiliar with the device to the differences in phone usage. Some participants spoke about relay telephone service. The lines are often busy, and the wait for service is sometimes long.

Caregivers addressed the importance of telephone contact for their family members with functional limitations. Some felt peace of mind knowing their loved ones had portable phones in the event that they required assistance while the caregiver was out of the house. Several participants sought better methods of summoning help, particularly for their relatives who experience communication or cognitive problems. One focus group discussed the curtness and seeming unwillingness of telephone operators to assist consumers with disabilities. Participants considered locating telephones in such places as the kitchen, since some caregivers must monitor relatives who have cognitive impairments to ensure their safety around the stove.

Televisions

Television is a mixed blessing for older people with disabilities. Some consumers found it provides a means for feeling less isolated from other people. This form of entertainment provides a shield against "just sitting, waiting for time to pass." Other participants perceived it as a pacifier. A caregiver pointed out that her household does not have a television. She believed that her mother was more mentally alert and more receptive to socializing with family members without it as a diversion.

Focus group members with hearing impairments commented that television speakers are often small and the audio component is difficult to decipher. Captioning is a valuable service that allows these consumers to follow programs. One participant complained, however, that captioning goes too fast, and is hard to follow. She recommended that the captions be enlarged to make them easier to read.

Caregivers felt that television remote controls could be improved. They believed that some consumers would benefit from the illumination of the channel that has been turned on. They also suggested that large switches located far apart would assist many consumers. Participants with visual impairments recommended large buttons with proper contrasts on televisions.

Computers

The focus groups consisting of older persons with visual impairments addressed computer technologies in detail. A participant cited the Apple computer as being affordable, with lots of software that could be used by consumers with visual limitations. Focus group members praised speech synthesizers since more people are able to use them than other technologies which depend on tactile or large print methods. Consumers considered speech synthesizers to be expensive. Some focus group members felt that manual scanners were difficult to handle since they require steadiness of hand.

Consumers with visual limitations commended the Braille 'n Speak, a talking laptop computer with braille keys that was primarily designed as a notetaker. They appreciated such features as its light weight (13 oz.) and portability, as well as its capacity to enter a

computer file immediately. Users commented on the device's ability never to cover over previously written information.

Visually impaired computer users had recommendations for equipment improvement. Flashing lights on a computer are an inappropriate cue for this population. They suggested instead use of a multiple tone beep with speech synthesis. They criticized the shift button on newer computers and electronic typewriters. When pressed, it does not lock down. Consumers cannot feel that it is depressed or know if they are using all capital letters. Participants also commented on glare problems and the lack of contrast on computer screens, as well as small letters on the keyboard.

Consumers with visual impairments complained that certain computer worlds were closed to them. For instance, at that time, Prodigy, the on-line information system, could not be used with a speech program. Conversely, participants perceived telebanking services, where automatic withdrawals can be made from individual checking accounts to pay bills by telephone, to be a useful service. Total privacy is still lacking, however, since someone or something is still needed to read the amounts payable on a bill.

A computer user with manual dexterity problems complained that the machine is often designed for right handed people, e.g., the disks are often built into the right side. Some participants mentioned that use of both hands simultaneously for computer commands was a problem. Other focus group members recommended adapting the computer so that actions could be performed by hitting a single switch. A mobility focus group considered keyboard problems. A member commented on accidentally pushing more than one key at a time.

A member of a mobility focus group commented on the Sharp memory device. It has a full keyboard; he inputs names, addresses, and telephone numbers. Messages appear on a screen and can be heard as well.

A few caregivers commented on the potential of computers. They mentioned how such equipment facilitates writing for their family members. One caregiver group discussed electronic communication boards. While important for communicating with nonvocal persons, some caregivers identified them as a slow, frustrating way to converse. They sought upgrades which would make devices perform faster. In other focus group sessions, some expressed interest in learning more about computers. Caregivers, who often live on limited income, criticized the price of computers and software.

Information Channels for Learning about Consumer Products

Year 3 focus group members commented on the difficulties they experience in learning about existing products that can make their lives easier. The information sources they cited were fragmented and inadequate although numerous. These included catalogues, specific disability-related publications, informative braille and cassette magazines and newsletters, and voluntary organizations as well as word of mouth recommendations from

fellow support group members, friends, family members, and medical or rehabilitation professionals. These findings are consistent with data derived from the first two years of the Consumer Needs Assessment Study.[12]

Many consumers acknowledged that they did not know how to find out about assistive devices. In addition to lacking sources of general product information, some consumers were uninformed about where their equipment could be serviced or repaired. They sought a central clearinghouse for consumer information, where unbiased testers would conduct product evaluations. Some group members recommended a national hotline; others suggested periodic product fairs where consumers could test devices and observe on-site product demonstrations. Focus group members discussed disseminating product information through a variety of methods: loaning videotapes of equipment in use, making catalogues available on audiotape through the Library of Congress talking books program, creating a directory of assistive device companies, developing increased awareness through television spots and information in the popular press, and using home computers to tap into product databases. They also advised making information available through typical points of contact for persons who have functional limitations, including ear, nose, and throat (ENT) doctors and audiologists, optometrists, and ophthalmologists. Participants recognized the need for better marketing and promotion techniques to inform them about such technologies.

Non-traditional conduits of information may provide effective strategies for reaching out to older people with functional limitations. A member of a mobility impairment focus group discussed an informal network through which he receives product information; those who have and use motor homes. Many owners are older and retired, and motor home trade magazines advertise specialty products. This participant said that he has borrowed and tested several assistive devices while vacationing at motor parks.

Participants who are blind or visually impaired explained that information of all kinds, including data on devices, is the hardest thing for them to access. They wanted additional cassette catalogues and toll-free telephone numbers as resources. Members of a Northwest sensory impaired focus group commented that it was often difficult to obtain demonstrations of new equipment, since many companies that manufacture products for those who are blind or visually impaired are located in the East. These consumers gained limited access to hands-on experience with products through friends, trade shows, and computer product fairs. While they tested equipment at public exhibitions, focus group members admitted that long delays were not uncommon, since others sought the same opportunities.

While their knowledge and sophistication levels regarding technology vary greatly, focus group members agreed that information sources must be increased and upgraded. Some participants managed to exchange valuable data about resources during the focus group sessions. Substantial discrepancies in knowledge still exist, however, and need to be corrected.

General Recommendations for Product Improvement

Consumers felt that products could be improved if they participated in testing new devices. They praised the EIF/REC Consumer Needs Assessment Project as a necessary starting point and sought additional opportunities to explain their needs to designers and manufacturers. Some recommended that designers spend time with them, watching and learning about their functional limitations first-hand. Others were eager to try out experimental equipment while it was still in the prototype stage. One participant exclaimed, "Oh boy, I'd love to be on a test panel."

Participants explained the advantages of experimenting with new products before they enter the marketplace. Focus group members realized that manufacturers would be hesitant to retool or redesign devices after the fact. So, they suggested that they work directly with industry to develop practical devices that they and their family members would use. Although focus group members recognized that their needs were diverse and could differ or clash in some instances, they felt their involvement in product testing could promote the development of better devices.

Creative Solutions to Consumer Needs

When you have to do something, you get ideas.

In many Year 3 focus groups sessions, participants delineated strategies for coping with daily problems they faced. Sometimes, they employed existing products for different purposes than those for which they had been created. For example, a member of a manual dexterity group used a dental flosser to thread needles. A member of a mobility group heard that a certain kind of packing material could substitute for Dycem, a rubbery substance that anchors items in place. Participants used needlenose pliers to open milk cartons, employed syringes to measure and squirt a liquid medicine into a relative's mouth, or placed nail polish on a washing machine or a computer printer as a position indicator for consumers with visual impairments.

Consumers recognized the importance of planning ahead in order to accomplish tasks effectively. One focus group participant outlined suggestions for travel arrangements and devices needed when traveling. For instance, he recommended a lightweight wheelchair that folds and fits easily into a vehicle. It would have removable arm and foot rests and pneumatic tires. He also mentioned seat canes, folding walkers, a pivot disk for transfers, and a pocket size flashlight. He explained the importance of being prepared for delays, as well as avoiding congested travel times.

Caregivers had several device tips that they shared within the focus groups. For instance, a care provider discussed placing a bell on wheelchairs for persons unable to reach the cord to signal getting off the bus. Color coding was employed for those unable to understand numbers or words. As an alternative to an expensive hospital bed, one caregiver

rigged a rope by which his relative pulled herself up. Other ideas entailed using a clothesline so that a wheelchair user could walk the dog, lining lower cabinets with yellow paper so they could be seen, and placing letters on top of medicine bottles so the user could distinguish among different medications.

Caregivers also discussed emotional coping mechanisms. One participant described her experience, "Through the years we've kind of got it all down to a system ... we decided we couldn't change it. So, we might as well accept it and get going and handle it." Variations in the caregiving regimen did take place over time. A spouse explained, "I did a lot of caregiving in the beginning. But then after he adjusted ... he was able to do a lot of the care himself."

Differences existed between some of the needs of caregivers with cognitively impaired relatives and those caring for family members with physical limitations. While safety was a concern for both sets of caregivers, monitoring the actions of care recipients with cognitive impairments appeared especially difficult, since often their communication skills were lacking. Caregiver tasks were not easy for either type of caregiver. As one participant related, "I've been a nurse for 42 years and that doesn't help you much when you're trying to take care of someone you love ... it sure is frustrating." Yet, family members showed their resilience in many ways. A caregiver remarked, "Sometimes the bed doesn't get made. I don't care. That's not what is important. What's important is keeping him in good spirits and seeing that he's able to do whatever he wants."

Wish List Items

Throughout the life of the Consumer Needs Assessment Project, focus group participants have been asked to identify products that they want or need. Many of these products exist in the marketplace already. However, consumers may not know of their availability (riser wheelchairs) or may be unable to afford them (e.g. cellular telephones). Other wish list components may be improvements or modifications on products that consumers already use (e.g. vacuum cleaners or remote controls). Many of these items provide consumers with privacy and independence. Wishes that do not translate into products per se are included (e.g., increased social opportunities for persons with disabilities). Each functional limitation category and the caregiver grouping will be listed separately to show both the similarity and diversity of needs.

Hearing Impaired Focus Group Wish List Items

Communication Devices

- Improved high performance amplification on hearing aids.

- Improved television amplification that would exit the tv like an audio loop and enter into a neck loop.

- A directional microphone to add to an FM hard wire system to bring a speaker's voice closer to the user, particularly where lots of background noise exists.

- A telephone with a television screen so that the user could see and read the lips of the other speaker.

- A telecaptioning decoder that can be accessed through using special glasses (similar to three dimensional movie effects used in the 1950's) for movies shown in theaters.

- Amplified telephone handset.

- Conference FM system for use when attending meetings.

- Full captioning on all television programs.

Mobility Devices

- Non-maintenance batteries for electric scooters that users do not need to monitor.

Other Wishes

- Government subsidies to lower the cost of products.

- Clothes and shoes, as little money is left once bills are paid.

Manual Dexterity Focus Group Wish List Items

Communication Devices

- Economical car and cordless phones.

- Telephone booths that drivers can reach from cars (presently available in some states).

Mobility Devices

- Reacher.

- Step stool with hand rail for access to reach things.
- Slide along stools to reach shelves in stores.
- Automatic lift so top shelves can be reached.
- Walkers that fit on steps or can be used with vacuum cleaner.
- Motorized wheelchairs.
- Improved, less costly wheelchair cushions.
- Wheelchair batteries that can be plugged into and charged in a vehicle's cigarette lighter while user is driving.
- Automatic car door opener since these doors are often heavy.
- More electronically opened doors in public places.

Household Appliances

- Inexpensive lazy susans to place in cabinets.
- Improved electric can opener with wider space for can edges, using velcro underneath to stabilize the cans.
- Kitchen sink with overflow mechanism, similar to those found in bathrooms.
- A way to hold down sewing materials.
- More remote controls.
- Lightweight, powerful vacuum cleaner.
- Refrigerators with freezers on the bottom since they are used less often than other parts of the device.
- Easy to clean glass top stoves with no coils or disks.

Health-related Device

- Electrical stimulation to cause sphincter muscles to work.

Assistive Devices

- Something to help plug in appliances.
- Heavy duty buttoning device for corduroy and winter pants.
- A sponge to wash one's back easily.
- A robot to help around the house.
- A mop that can be wrung out with one hand.

Other Wishes

- A person who will come to clean the house.
- A handicapped accessible apartment.
- A house.

Mobility Focus Group Wish List Items

Mobility Devices

- Locking mechanism, like cruise control, for a powered wheelchair's joystick, when going straight for a long distance. It would be an improvement over relying on a user's muscular control. A touch of the hand would stop or slow down the movement.
- High technology wheelchair with built-in cellular phone for emergencies.
- Electronic breaking device on wheelchair so that when descending a ramp, the user does not go too fast.
- Carrying area for briefcases on the backs of wheelchairs.
- Wheelchair wheels with traction for icy conditions.
- Clamp-on brace that adheres to the outside of any shoe. Plastic braces within a user's shoe become hot, causing blisters.
- Remote control to open and close doors.

- Chair with swivel wheels so user is unrestricted and can reach objects.

- Various risers including one that could assist an individual to transfer independently from bed to a chair, portable models that could be placed in any seat, or a type that the consumer could pull over, sit on, and be lifted up after falling.

- Automatic tread-opened doors or door buzzers so that persons who frequent a business establishment can enter the building.

- Device that can haul an individual using a wheelchair up a ramp.

- Miniature hydraulic lift for a wheelchair to assist user to stand.

- Home whirlpool with lift for transfers.

- Shield, like a convertible or sunroof, to protect wheelchair users from rainy, snowy, or sunny weather conditions.

- A clip on a walker to hold an umbrella.

Household Appliances

- Appliances that could be operated with the blink of an eye.

- Electric tools with controls for the one handed person.

- A heavy pot that would stir itself for making candy.

Health-related Devices

- Decently designed leg bags with wide velcro straps instead of rubber ones.

- Durable hospital bed.

- An exercise machine for a person who uses a wheelchair.

Assistive Devices

- Velcro packaging and zip bags for storing products.

Other Wishes

- Human assistance so that an individual could live at home, not in a supervised setting.
- Improved social opportunities for persons with disabilities.

Visually Impaired Focus Groups Wish List Items

Communication Devices

- A television channel announcer so when a user turns to a tv station, it is identified by speech.
- A talking calendar.
- Voice synthesized address book.
- Voice directories in stores, special events telephone numbers.
- Talking menus that would identify dishes and their prices.
- Talking watch.
- Stronger hearing aids that can eliminate background noises.

Mobility Devices

- Satellite navigational system used as mobility orientation device. Pint size radar to keep individual away from danger.
- A talking car that transports the user.
- A portable, compact optical character recognition (OCR) scanner to observe street signs, bus stops, or scan the prices of products in stores.

Household Appliances

- Talking microwave.
- Braille thermostat.

- Voice activated thermostat.
- Voice activated house.

Low Vision Aids

- Large rearview mirrors for cars.
- Strong hand held magnifier.
- High powered mirror so user could see to comb hair.
- Eyeglasses that do not require thick lenses, as well as attractive frames for thick glasses.
- Compact binocular type glasses for such conditions as retinitis pigmentosa.
- Large print in stores and in other public facilities.
- Needles that can be easily threaded.

Other Wishes

- Public bathrooms labeled with raised braille on the door or other identifying marks.
- Cure for macular degeneration.
- The eyes of the "$6 million dollar man."

Caregiver Focus Group Wish List Items

Communication Devices

- A non-squealing microphone to amplify speech.
- Non-shrill, yet audible sirens to alert caregivers of potential wandering behavior.
- Monitor to alert caregiver of relative's needs when they are in different parts of the house.

- A telephone with pictures where a cognitively impaired user could press a button and it dials an individual directly. A certain beep or prerecorded message could indicate it was the care recipient calling.

- Simple tape recorders for persons with dementia to use.

Mobility Devices

- Riser wheelchair.

- Stool with hydraulic pump to raise and lower user.

- A system to transfer people from seats that is less expensive and lighter than riser chairs on the market.

- "Car jack" for bathtub to lower and raise a person.

- Buffer chains that allow individual to move from room to room in standing position.

- Lightweight, graphite wheelchairs.

- Wheelchairs of adjustable heights so user can reach for objects.

- Inexpensive wheelchair poppers.

- Transportable device, a lever or handle, to lift a wheelchair into a vehicle.

- Better wheelchair handles, like those on a shopping cart. Adjustable handles would be useful as well.

- Device to carry around a drink so while at a party, the user can pay attention to his or her walking.

- Non-slick railings with patterned handles.

- Shoe with rounded arch to avoid festination (walking in a short, quick shuffling manner).

Household Appliances

- Accessible smoke detectors that a person who uses a wheelchair can disengage or reset without assistance.

- Cabinets that have magnets within so they can be hit and the doors open.

Health-related Devices

- Adult latches for kitchen and medicine cabinets to prevent persons with dementias from independent access to these areas.
- Sturdy, inexpensive pill crusher.
- Sensors in adult diapers to avoid rashes.

Other Items

- Socks that are split down the middle and attached with velcro for easy placement on another person.
- Washable seat covers with a deodorizer and stain proof bed sheets to cope with incontinence.

Other Wishes

- More accessible public facilities.
- Recognize the ergonomic needs of caregivers when designing assistive technologies employed by consumers with disabilities and their caregivers.

Conclusion

Some focus group members who have functional limitations expressed concern about whether their ideas and opinions about their product and technology needs would be taken seriously. One participant stated, "Well, there are many things that are lacking, but the problem is nobody pays any attention to the old." Caregiver participants, often exhausted by the demands of providing assistance to older relatives, found it difficult at times to verbalize their needs. Because of the pressure of its sheer numbers, however, aging consumers and their caregivers are groups whose technology needs cannot be bypassed.

These demographic changes are reflected in the actions of mainstream organizations that serve older people. For instance, the American Association of Retired Persons (AARP) is beginning to address the product needs of its members who have chronic conditions and impairments. Recently, its magazine, Modern Maturity, included an article on appliance manufacturers that appeared in its "Consumer Alert" column. Fourteen companies were surveyed about specialty items that they make available to consumers with disabilities to facilitate use of their products. Although few of the companies polled provided such assistive

devices, it is noteworthy that AARP brought this to the attention of its 29 million member audience.[13] AARP has also sponsored consumer studies on hearing aids, walkers, and wheelchairs.[14]

The EIF/REC focus group sessions held during the third year of the Consumer Needs Assessment Project contained a wealth of ideas and diversity of opinion that defied age or caregiving stereotypes. Orientation to technologies did not appear to be a function of age. Although some people cited generational issues as an excuse for failing to use devices, many fellow focus group members disagreed with this viewpoint. Such attitudes were shaped by personal experience, feelings about oneself and one's disability, as well as individual proclivity, and access to information about and training on these products. Age in and of itself did not create barriers to the operation of assistive technologies or general consumer products. Design features were the most formidable obstacles to product use.

A sense of autonomy, of being able to take care of one's basic needs, was important to older people with functional limitations. A participant explained it this way, "... you still like to be your own boss, you have to be independent." Consumers discussed products that either helped fulfill this desire or created a sense of helplessness. Oftentimes, factors unrelated to technology, such as financial or social concerns, influenced consumers' sense of well-being and self-reliance.

Caregiver groups echoed this concern about independence by explaining that their relatives liked to do things for themselves (e.g., bathing or making a pot of coffee). Many older people also enjoyed helping out at home, doing such tasks as drying dishes. Numerous older consumers needed to be useful to others, either through paid employment or volunteer work. Strategies to build on this commitment can have an impact on the American workforce.

Consumers were able to identify product features that provided them with access to devices. Five factors were considered in Year 3: cost, safety, simplicity, control features, and ease of use. Many of these issues recurred when examining product selection criteria, specific products, and wish list items. As was true in earlier years of this research project, many needs raised were social or economic in nature, unrelated to devices per se. In the final year of the Consumer Needs Assessment Study, a comparison of design features highlighted in the preceding four years of the study will occur.

Consumers recognized the importance of stating their product needs. They wanted to be heard. As one consumer explained, "I know from dealing with electronic companies in the past that what we put in wish books today does come about."

Endnotes

1. Batavia, A.I. and Hammer, G.S. "Toward the Development of a Consumer-based Criteria for the Evaluation of Assistive Devices," Journal of Rehabilitation Research and Development, Vol. 27, No. 4, 1990, pgs. 425-436.

2. Sandow, S.A. and Trimble, J., "Technology Transfer: A Consumer-Oriented Integrated Model," RESNA'90, Proceedings of the 13th Annual Conference, Capitalizing on Technology, June 15-20, 1990, Washington, D.C., RESNA Press, 1990.

3. Consumers Union, "Memo to Members," Consumer Reports, New York, March 1991.

4. See Attachment, Moderators Guide.

5. See Phillips, L., "Consumer Needs Assessment: A Qualitative Study of the Needs of People with Disabilities, Results of the First Year of a Five Year Study," Washington, D.C.: Electronic Industries Foundation, 1989 and Ward, C, "Design for All: Consumer Needs Assessment Project Year 2, Results from the Second Year of a Five Year Study," Washington, D.C.: Electronic Industries Foundation, 1990.

6. See Acknowledgements.

7. See Ward, C., Design for All, p. 2

8. See Ward, C., p. 33.

9. American Association of Retired Persons and the Administration on Aging, A Profile of Older Americans, 1990.

10. See Phillips, p. 5.

11. See Ward, p. 5

12. See Ward, p. 12 and Phillips, p. 6.

13. American Association of Retired Persons, "Special-need Customer Needs to Speak up," Modern Maturity, Vol. 34, No. 3, June-July 1991, p. 12.

14. For further information on AARP Product Reports, contact AARP Fulfillment, 601 E Street, NW, Washington, DC 20049.

Attachment

MODERATOR'S GUIDE

Introduction

The goal of this discussion is to find out, from your perspective, about types of technology that can help you in your daily life. I ask you to share your opinions on devices that fall into two broad categories:

- Devices specially designed to assist persons with disabilities -- wheelchairs, hearing aids; and

- General consumer products -- telephones, tv's, ovens, refrigerators, computers.

The aim is to consider what works for you, what doesn't, and why. This research seeks to discover whether and/or how devices can be improved to better meet your needs.

Older Consumer Issues

I. Impact of technology on older peoples' lives

Briefly describe what limitations you have.

What devices, either adaptive equipment or general consumer products, do you use to help you compensate for physical limitations? For what purposes do you use these devices?

What appliances do you have in your home? Are you able to use all the bathroom, bedroom, living room, and kitchen appliances in the house? If not, why?

Let's discuss how you select products that you currently use at home. For instance, have you considered obtaining certain devices, but then decided against acquiring them? Why (e.g., they are difficult to operate)? Please identify specific examples.

How do you manage such activities as laundry, housekeeping, eating?

Do you or did you work outside of the home? In the workplace, what kind of equipment do you/did you use to function on the job? Do you have any ideas on what kinds of products could help you in a work setting?

Can you identify other products that help you to participate in activities outside of the home or the workplace, such as when you attend church, go to the movies, or out to eat? How do these devices assist you?

II. Feelings about using devices

If you had to choose one device you depend on the most, what would it be? How would you manage without it?

What features do you like about this device? Why?

What features do you dislike?

If you had to choose one device that you most enjoy using, what would it be? Why?

If you had to choose one device you do not like to use, what would it be? Why?

Can you discuss in general, features that you like or dislike in devices (e.g., size, weight, shape, appearance, cost, control mechanisms)?

Are there devices you have used and abandoned? Or devices someone gave you that remain in the closet? How were these devices acquired? Why do you not use them?

III. Actual experiences with and attitudes towards devices in these settings

Have you thought about ways that both specially adaptive devices and general consumer products you use could be improved? Cite examples.

Can you tell of positive experiences you have had using specific equipment? Conversely, have you had bad experiences with devices that have caused you to avoid using the equipment? Please be specific.

IV. Transportation issues

Let's discuss issues related to public and private transportation. How do you get around?

What kinds of activities do you attend outside of the home (church, sporting events, concerts, meals out, shopping)? What issues do you need to take into account in participating in such outings?

V. Workplace issues

If you are not currently working and worked in the past, what led you to decide to retire?

How do you spend your time? Can you think of devices you could benefit from that you do not currently have?

If you could, would you like to go back to the workplace? Why? Why not? What devices, if any, would allow you to work? What other factors would affect your decision to return to the workforce?

VI. Knowledge of what exists, benefits and disadvantages

How do you learn about general consumer products?

How do you learn about assistive devices?

Are these sources of information adequate?

What kinds of information do you need to assess whether a particular device, either a general consumer product or an assistive device, is right for you?

Are there other methods of finding out about devices that would be more helpful to you? What are they?

VII. Financial issues

How do you pay for assistive devices? Are there products you have wanted that you haven't been able to find external sources that will pay for them? What are they?

VIII. Other issues

What piece of equipment do you wish you could have? What prevents you from acquiring it?

Is there something you would like to see invented that doesn't currently exist? What is it?

Is there any topic related to technology that we still need to cover?

Are there other issues we need to discuss?

IX. Thanks and conclusions

Caregiver Issues

I. Impact of assistive technology on caregivers' lives

Briefly describe the limitations of the person for whom you provide care. Additionally, do you have any chronic conditions that affect your ability to be a caregiver (e.g., hypertension, back problems, other)?

What devices, either adaptive equipment or general consumer products, do you use to help you in your caregiving duties? For what purposes do you use these devices?

What appliances do you have in your home? Is the person you care for able to use bathroom, bedroom, living room, and kitchen appliances without assistance? If not, why? Are there ways that appliances could be changed so that your relative could use them independently?

Do you or did you work outside of the home before/or in addition to becoming a caregiver to your spouse, relative, or friend? In the workplace, what kind of equipment do you/did you use to function on the job? Do you have any ideas on what kinds of products could help you in the non-caregiving work setting?

Can you identify other products that could help you participate in activities outside of the home or the workplace? For example, when you go to church, out to a movie, or out to eat? How would these devices assist you?

II. Feelings about using devices

If you had to choose one device you depend on the most, what would it be? How would you manage without it?

What features do you like about this device? Why?

What features do you dislike?

If you had to choose one device you most enjoy using, what would it be? Why?

If you had to choose one device you do not like to use, what would it be? Why?

Can you discuss in general, features that you like or dislike in devices (e.g., size, weight, shape, appearance, cost, control mechanisms)?

Are there devices you have used and abandoned in caring for your older relative? Or devices someone gave you that remain in the closet? How were these devices acquired? Why do you not use them?

Is there equipment you have obtained for your older relative that he or she refuses to use? Or is there equipment that he or she cannot use? Why?

Are there devices that you have persuaded your family member to use? What are they? How did you convince your relative to use these products?

III. Actual experiences with and attitudes towards devices in these settings.

Have you thought about ways that both specially adaptive devices and general consumer products you use could be improved? Cite examples.

Can you tell of positive experiences you have had using specific equipment in your caregiving duties? Conversely, have you had bad experiences with devices that have caused you to avoid using certain equipment? Please be specific.

IV. Transportation issues

Is it difficult for you to take your older relative places by public or private transportation? How do you manage to help him/her get around?

Do you yourself have problems with public or private transportation? What are they?

What kinds of activities do you attend outside of the home (sporting events, concerts, meals out, shopping)? What issues do you need to take into account when participating in such outings?

V. Workplace issues

If you are not currently a part of the workforce and were employed outside of your home in the past, what led you to decide to leave the workforce?

How do you spend your time? Can you think of devices you could benefit from that you do not currently have?

If you are not currently employed beyond your caregiving responsibilities, would you like to go back to the workplace? Why? Why not? What devices, if any, would allow you to work outside the home? What other factors would affect your decision to work?

For those currently working outside the home, are there devices that could help you handle both caregiving and work responsibilities? Are there other things that could help you better manage these multiple tasks?

VI. Knowledge of what exists, benefits and disadvantages

How do you learn about general consumer products?

How do you learn about assistive devices?

Are these sources of information adequate?

What kinds of information do you need to assess whether a particular device, either a general consumer product or an assistive device, is right for you or for the family member you care for?

VII. Financial issues

How are your relative's assistive devices financed (insurance, out of pocket costs, other)? Are there products you have wanted to obtain to make caregiving tasks easier, but you haven't been able to find external sources that will pay for them? What are they?

VIII. Other issues

What piece of equipment do you wish you could have? What prevents you from acquiring it?

Is there something you would like to see invented that doesn't currently exist? What is it?

Is there any topic related to technology that we still need to discuss?

Are there other issues we need to discuss?

IX. Thanks and conclusions